WHAT IS CLAIMED IS:

Sub A1. A method for determining a branch metric in a maximum-likelihood-sequence-estimation equalizer which receives at least one antenna signal modulated with M-ary modulation, said method comprising the steps of:

pre-computing values equal to a product of a complex number and a hypothetical symbol value;

storing said pre-computed values in a product table;

adding select pre-computed values from said product table to produce a result; and

determining said branch metric using said result.

2. The method of claim 1 wherein said complex number corresponds to a channel coefficient.

3. The method of claim 1 wherein said complex number corresponds to a s-parameter.

Sub A2. A filter in a maximum-likelihood-sequence-estimation equalizer, which demodulates at least one received radio signal modulated with M-ary modulation, for producing a hypothesized received signal sample to be used for determining a branch metric, said filter comprising:

a memory for storing a product table having pre-computed values equal to a product of a channel tap estimate and a hypothetical symbol value for different iterations; and

an adder for adding select entries from the product table to produce a hypothesized received signal sample.

Sub C1

5. A filter in a maximum-likelihood-sequence-estimation equalizer for M-ary modulation, said filter comprising:

means for pre-computing a plurality of possible values to be used in determining a branch metric;

a memory for storing said plurality of pre-computed possible values; and

means for combining select pre-computed values from said memory.

6. The filter according to claim 5 wherein said branch metric is an Ungerboeck branch metric.

7. The filter according to claim 5 wherein said branch metric is an Euclidean branch metric.

8. The filter according to claim 5 wherein said branch metric is a partial Ungerboeck branch metric.

Sub C2

9. A method for computing a branch metric in maximum-likelihood-sequence-estimation equalizer which demodulates M-ary modulated signals, said method comprising the steps of:

pre-computing a plurality of possible values to be used in the branch metric computation;

storing said plurality of pre-computed possible values in a memory;

adding select pre-computed values from said memory; and

computing said branch metric using said added select pre-computed values.

10. The method according to claim 9 wherein said branch metric is an Ungerboeck branch metric.

11. The method according to claim 9 wherein said branch metric is a partial Ungerboeck branch metric.

12. The method according to claim 9 wherein said branch metric is an Euclidean branch metric.

Sub A3

13. A method for computing a branch metric in a multi-channel maximum-likelihood-sequence-estimation (MLSE) equalizer which demodulates M-ary modulated signals, said method comprising the steps of:

pre-computing a plurality of possible values for each channel in said multi-channel MLSE to be used in the branch metric computation;

storing said plurality of possible values for each channel in separate product tables;

adding select values from said separate product tables; and

computing said branch metric using said added select values.